

PROGRAM CHARTER

FOR

Integrated Ocean Observing System (IOOS)

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1. EXECUTIVE SUMMARY

The United States Integrated Ocean Observing System (IOOS) is a coordinated network of people and technology that work together to generate and disseminate continuous data, information, models, products and services on our coastal waters, ecosystems, Greats Lakes and oceans. IOOS is our nation's ocean contribution to an international effort called the Global Earth Observation System of System (GEOSS), which is designed to continuously and comprehensively monitor Earth and transmit observations globally.

Two interdependent components constitute the IOOS: (1) global ocean component and (2) national coastal component. IOOS is the U.S. contribution to the Global Ocean Observing System, or "GOOS." GOOS is a global system for sustained ocean observations designed to improve weather forecasts and climate predictions. The national coastal component of IOOS includes U.S. observations, products, and services provided by 15 Federal agencies to monitor and manage the Great Lakes and entire U.S. coastal ocean environment. The coastal component also includes a network of 11 non-Federal Regional Associations of Regional Coastal Ocean Observing Systems that expand observing coverage to provide data of particular interest to local communities.

As part of a National program, the IOOS program will work closely with other Federal Agencies, State, academic and industry partners to routinely, reliably and continuously acquire and disseminate data and information on past, present, and future states of the oceans, the nation's coastal waters, and Great Lakes. The National Oceanic and Atmospheric Administration (NOAA) has participated in the development of the U.S. IOOS since its beginnings in the late 1990s. In February 2007, VADM Conrad C. Lautenbacher, Under Secretary of Commerce for Oceans and Atmosphere and Administrator of NOAA, established a new program within the Mission Support Modeling and Observing Infrastructure Sub-Goal to serve as the overall coordinator of NOAA's IOOS activities and to provide a consistent management function. The program's mission is to "Lead the integration of ocean, coastal, and Great Lakes observing capabilities, in collaboration with Federal and non-Federal partners, to maximize access to data and generation of information products, inform decision making, and promote economic, environmental, and social benefits to our nation and the world."

The program's existence is directed by the U.S. Ocean Action Plan and Executive Order. NOAA is taking the lead to build an IOOS for the nation. The stand up of the IOOS program within NOAA is defined by the NOAA Decision Memorandum dated Dec 15, 2006. The IOOS Program's mission is to execute IOOS within NOAA in collaboration with Federal and non-Federal partners. As such the IOOS program will participate with all Goal Teams to ensure that the required capabilities across NOAA for IOOS are leveraged and guided.

2. PROGRAM REQUIREMENTS

A. Requirement Drivers:

1) Legislation

- a) National Defense Authorization Act for Fiscal Year 1997 (Public Law 104-201 Sections 281, 282, 665, 7901, 7902. Established the National Oceanographic Partnership Program, the National Ocean Research Leadership Council and the Ocean Research Advisory Panel. This laid the requirement for the United States

Integrated Ocean Observing System.

- b) Inland Flood Forecasting and Warning System Act of 2002, 15 U.S.C. 313c, Pub. L. 107-253, Oct. 29, 2002, 116 Stat. 1731. Authorizes NOAA, through the United States Weather Research Program, to conduct research and development, training, and outreach activities relating to inland flood forecasting improvement, and for other purposes. This driver supports the coastal inundation theme supported by the IOOS Data Integration Framework.
- c) National Weather Service Organic Act, 15 U.S.C. 313. Directs National Weather Service to forecast the weather, issue storm warnings, collect and transmit marine intelligence for the benefit of commerce and navigation, report temperature and rainfall conditions, and take such meteorological observations as may be necessary to establish and record the climate conditions of the United States.
- d) Hydrographic Services Improvement Act of 1998, 33 U.S.C. 892 et seq. This Act clarifies some of the responsibilities and authority of the NOAA Administrator for NOAA navigation programs. It authorizes the Administrator to design and install the Physical Oceanographic Real Time Systems (PORTS).

2) Policy Decisions

- a) The U.S. Ocean Action Plan, December 17, 2004. Calls for the nation to “Build a Global Earth Observation Network, Including Integrated Ocean Observation.” This includes integrating the U.S. ocean observing efforts into the Global Earth Observation System of Systems (GEOSS).
 - b) First U.S. Integrated Ocean Observing System (IOOS) Development Plan – A Report of the National Ocean Research Leadership Council and the Interagency Committee on Ocean Science and Resource Management Integration (ICOSRMI), January 2006. Provides a framework for the development of IOOS through a phased approach establishing structure and governance, integrating existing operational assets, and improving initial IOOS through enhancements and research. The First U.S. IOOS Development Plan (IDP) recommends NOAA be the lead for administration and co-lead for all remaining aspects of IOOS implementation except research, which lists NOAA as a partner with the National Aeronautics and Space Administration and the National Science Foundation as co-leads.
 - c) Charting the course for Ocean Science in the United States for the Next Decade – An Ocean Research Priorities Plan and Implementation Strategy. (ORPP) NSTC Joint Subcommittee on Ocean Science and Technology, January 26, 2007. The ORPP highlights three central elements of science and technology, including “Deploying an ocean-observing system that can accurately describe the state of the ocean...”, six theme areas and four near-term priorities. IOOS development will directly support the ocean-observing element and contribute to each of the theme areas or priorities.
 - d) Interagency Oceans and Human Health Research Implementation Plan: A Prescription for the Future. The Interagency Working Group on Harmful Algal Blooms, Hypoxia, and Human Health (OHHI), Joint Subcommittee on Ocean Science and Technology, 2007. The OHHI identified six implementation actions to advance OHH research and application, leading to reduced health risks and increased health benefits for people. Action 3, support research infrastructure, specifically included IOOS related activities such as ocean observing and cyber infrastructure to enable data sharing and integration.
 - e) NOAA Executive Council/NOAA Executive Panel (NEC/NEP) Decision Memorandum dated December 15, 2006. This Decision Memorandum approved the establishment of a NOAA IOOS program within the National Ocean Service to
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deliver an initial operating capability providing integrated access to five core variables to support four model areas with benchmarked model/product improvements available for operational use in 36 months (February 2010).

B. Mission Requirements:

- 1) Provide overall management and execution oversight for the development of a NOAA Integrated Ocean Observing System. Primary drivers are: NEC/NEP Decision Memorandum dated December 15, 2006; First U.S. Integrated Ocean Observing System (IOOS) Development Plan; U.S. Ocean Action Plan; and, Charting the Course for Ocean Science in the United States for the Next Decade – An Ocean Research Priorities Plan and Implementation Strategy.
- 2) Develop the capability to deliver integrated core IOOS variables from NOAA and non-NOAA observing systems to benefit NOAA's mission. Primary drivers are: NEC/NEP Decision Memorandum dated December 15, 2006; First U.S. Integrated Ocean Observing System (IOOS) Development Plan; U.S. Ocean Action Plan; Inland Flood Forecasting and Warning System Act of 2002; National Weather Service Organic Act; Hydrographic Services Improvement Act of 1998; and, Interagency Oceans and Human Health Research Implementation Plan: A Prescription for the Future.
- 3) Exercise NOAA's national leadership function for the implementation of the U.S. Integrated Ocean Observing System, including management and oversight of NOAA funding to Regional Associations and Regional Coastal Ocean Observing Systems and outreach to non-NOAA federal, state, local, and tribal governments. Primary drivers are First U.S. Integrated Ocean Observing System (IOOS) Development Plan and NEC/NEP Decision Memorandum dated December 15, 2006.
- 4) Maintain and improve the existing NOAA ocean observation capability operated by the National Data Buoy Center. Primary drivers are National Weather Service Organic Act and Inland Flood Forecasting and Warning System Act of 2002.

3. LINKS TO THE NOAA STRATEGIC PLAN

- A. Goal Outcomes: The NOAA IOOS program supports all four NOAA mission goals by collecting and improving access to coastal and ocean observation data, which is used in decision support tools. Specific outcomes for each mission goal include:
- 1) Ecosystem Mission Goal Outcome: Healthy and productive coastal and marine ecosystems that benefit society.
 - 2) Climate Mission Goal Outcome: A predictive understanding of the global climate system on time scales of weeks to decades with quantified uncertainties sufficient for making informed and reasoned decisions.
 - 3) Weather and Water Mission Goal Outcomes: Reduced loss of life, injury, and damage to the economy; Better, quicker, and more valuable weather and water information to support improved decisions; and Increased customer satisfaction with weather and water information and services.
 - 4) Commerce and Transportation Mission Goal Outcome: Safe, secure, and seamless movement of goods and people in the U.S. transportation system.
- B. Goal Performance Objectives: To appropriately support the above mission goal outcomes, IOOS employs the strategies listed in the next section to pursue the following performance objectives:
- 1) Ecosystem Mission Goal:
 - a) Increased number of coastal communities incorporating ecosystem and sustainable development principles into planning and management.

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- 2) Climate Mission Goal:
 - a) Improved climate predictive capability from weeks to decades, with an increased range of applicability for management and policy decisions.
 - b) Reduced uncertainty in climate projections through timely information on the forcing and feedback contributing to changes in the Earth's climate.
 - 3) Weather and Water Mission Goal:
 - a) Increase lead time and accuracy for weather and water warnings and forecasts.
 - b) Improved predictability of the onset, duration, and impact of hazardous and severe weather and water events.
 - c) Increased coordination of weather and water information and services with integration of local, regional, and global observation systems.
 - d) Increased application and accessibility of weather and water information as the foundation for creating and leveraging public (i.e., Federal, state, local, tribal), private and academic partnerships.
 - e) Reduced uncertainty associated with weather and water decision tools and assessments.
 - f) Enhanced environmental literacy and improve understanding, value, and use of weather and water information and services.
 - 4) Commerce and Transportation Mission Goal:
 - a) Enhance navigational safety and efficiency by improving information products and services.
- C. Goal Strategies: The implementation of the U.S. IOOS is a critical part of the following mission goal strategies from the NOAA 2006-2011 Strategic Plan:
- 1) Ecosystem Mission Goal:
 - a) Improve resource management by advancing our understanding of ecosystems through better simulation and predictive models. Build and advance the capabilities of an ecological component of the NOAA global environmental observing system to monitor, assess, and predict national and regional ecosystem health, as well as to gather information consistent with established social and economic indicators.
 - 2) Climate Mission Goal:
 - a) Develop the ability to predict the consequences of climate change on ecosystems by monitoring changes in coastal and marine ecosystems.
 - 3) Weather and Water Mission Goal:
 - a) Improve the reliability, lead-time, and effectiveness of weather and water information and services that predict changes in environmental conditions.
 - b) Working with private industry, universities, and national and international agencies to create and leverage partnerships that foster more effective information services.
 - 4) Commerce and Transportation Mission Goal:
 - a) Expand and enhance advanced technology monitoring and observing systems, such as weather and oceanographic observations, ice forecasts and nowcasts, hydrographic surveys, and precise positioning coordinates, to provide accurate, up-to-date information.
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4. PROGRAM OUTCOMES

- A. Improved access to high-quality, integrated data
- B. Enhanced data products and decision-support tools
- C. Advanced the establishment of the US IOOS by NOAA, other federal agencies and Regional Coastal Ocean Observing Systems
- D. Establish a functional management structure that addresses all aspects of NOAA IOOS – management of IOOS within NOAA; management of regional observing systems; and coordination of interagency and international IOOS activities.
- E. Develop and implement cohesive NOAA IOOS Program planning
- F. Maximize societal and economic benefits of IOOS through targeted research, education and training
- G. Coordinate communications and act as an information broker to facilitate NOAA's distributed implementation of IOOS. Participate with regional coastal ocean observing systems.

5. PROGRAM ROLES AND RESPONSIBILITIES

This program is established and managed with the procedures established in the NOAA Business Operations Manual (BOM). Responsibilities of the Program Manager are described in the BOM. Resources for the program come from the National Ocean Service and from the National Weather Service. Responsibilities of other major participants are summarized below:

A. Participating Line Office, Staff Office, and Council Responsibilities:

- 1) NOAA's National Ocean Service (NOS) is responsible for the management and execution oversight for the development of a NOAA Integrated Ocean Observing System; development of the capability to deliver integrated core IOOS variables from NOAA and non-NOAA observing systems to benefit NOAA's mission; and, exercise of NOAA's national leadership function for the implementation of the U.S. Integrated Ocean Observing System, including management and oversight of execution of NOAA funding by Regional Associations and Regional Coastal Ocean Observing Systems and outreach to non-NOAA federal, state, local, and tribal governments.
- 2) NOAA's National Weather Service (NWS) is responsible for operating the NDBC Ocean Observing System (provides essential in situ oceanic and coastal observations), operations and maintenance of NOAA Telecommunications Gateway (to ensure communications support for observations) and links to NOAA's operational weather warning systems and infrastructure. Participates in the management and execution of an IOOS Data Assembly Center.
- 3) NOAA Satellites and Information (NESDIS) has the responsibility for providing data management activities through the National Data Centers and CLASS.
- 4) NOAA's National Marine Fisheries Service provides data management and support for the IOOS data integration framework, specifically in the area of integrated ecosystem assessments.

B. External Agency/Organization Responsibilities

- 1) Federal Agencies: Under the National Oceanographic Partnership Program, 14 Federal agencies share the responsibility for developing and executing the national Integrated Ocean Observing System (IOOS)
- 2) Ocean.US. A national office that provides the planning and collaboration to integrate existing and planned elements to establish a sustained ocean observing system to meet common research and operational agency needs.

- 3) Regional Associations and Regional observing systems. The Regional Associations provide governance for regional (State and local levels) coastal ocean observing systems, including understanding the needs of observing system users and ensuring that those needs are met. Provide the densification of the data that creates a more highly resolved “picture” of coastal conditions for forecasts and other products and services.
- 4) Inter-governmental Oceanographic Commission (IOC) of UNESCO. IOC provides member states of the United Nations with a mechanism for global cooperation in the study of the ocean. Mr. Jack Dunnigan is the U.S. representative to the IOC. The US IOOS includes is the US contribution to the Global Ocean Observing System (GOOS).
- 5) Academic Institutions – Conduct NOAA-supported research to support IOOS. Participate with regional coastal ocean observing systems.

6. END USERS OR BENEFICIARIES OF PROGRAM

- A. Federal agencies – allows agencies to leverage across complimentary capabilities to improve efficiencies and effectiveness.
- B. Ocean.US – program helps to develop and maintain a sustainable relationship between the US Government, industry, and international partners.
- C. Regional Associations and Regional Coastal Ocean Observing systems - RAs and RCOOSs benefit by receiving funding and guidance for their planning and implementation in support of IOOS and also benefit from the base line observations taken at the National level.
- D. IOC – NOAA IOOS program contributes to the establishment of US IOOS, which is the US contribution to the Global Ocean Observing System.
- E. Academia – this program will provide data used by university researchers with interests in coastal regions. Scientific understanding gained over the long term can help better predict coastal phenomena that directly affect coastal communities.
- F. Global community – The US IOOS and the Global Ocean Observing System will, as stated in the U.S. Ocean Action Plan, “benefit people around the world”. “The deployment and operation of IOOS will lead to:
 - 1) Improved understanding of climate change and its socio-economic consequences;
 - 2) Improved safety and efficiency of marine operations;
 - 3) More effectively mitigating the effects of natural hazards such as tropical storms;
 - 4) Reduced public health risks;
 - 5) Protecting and restoring healthy marine ecosystems more effectively; and,
 - 6) Improved ecosystem-based management of natural resources.